



Japanese Navy planes laying a smoke screen around a dummy warship.

VOLUME
XXIII

NUMBER
26

Special Features

The Vought "Corsair"
The Russell Parachute
The Airplane in Forestry

AVIATION PUBLISHING CORPORATION
250 WEST 57 STREET, NEW YORK

Publication Office, Highland, N. Y. Entered as Second-Class Matter, Nov. 23, 1920, at the Post Office, at Highland, N. Y. under Act of March 3, 1879.

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AVIATION PUBLISHING CORPORATION

Business and Editorial Office
250 West 57th St., New York City
Cable Address: AEROPRESS

Publishing Office: Highland, New York

Subscription rates: One dollar per year. Outside the United States, two dollars. Single copies, twenty cents. All orders, advertising rates, and circulation, please send to Aviation Publishing Corporation, 250 West 57th St., New York City. Payment in advance. Please allow four weeks for change of address. Please send old address label with new one. Please send old address label with new one. Please send old address label with new one.



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The Oldest American Aeronautical Magazine

Vol. XXIII

DECEMBER 26, 1927

No. 26

Aircraft Engines

IF TIME schedules of construction for 1928 as announced by the manufacturers of small aircraft engines are any where nearly lived up to there is no doubt that the stock of small war surplus engines will be completely exhausted long before the end of the year. This exhaustion has been anticipated and several individuals and groups laid plans and started the construction of engines last year. The expansion of the aircraft industry this year has however depleted the stock of war surplus engines much more quickly than we are to be expected and the question in everyone's mind is whether any engine of small horsepower will be on the market in sufficient quantities to meet the demand.

Although there are over a dozen engines of under 300 hp which are being developed and which are expected to be marketed for commercial use next year there are none, excepting those of foreign design, which have been successfully tested by widespread public use. Almost all engines of new designs have to have the "bug" worked out of them by their ultimate users and there is only one engine which has yet reached this in America. The matter is rather a disappointing one and it is hoped that the manufacturers of commercial planes will be far sufficient enough to co-operate to the fullest extent in the testing out of the new commercial engines. The great amount of time required to develop an aircraft engine still remains a mystery to the layman but it would seriously appear that with the program already made there should be a choice of commercial engines available by the middle of next summer.

The New Aeronautical Diplomacy

WHEN COLONEL Lindbergh made his epochal flight to Paris the world discovered a new unknown for aviation that had not been recognized. It was predicted that in the future the airplane might play a new role in diplomacy. A much broader plan than visits of attractive personalities, such as Colonel Lindbergh's flight to Mexico City suggested itself.

It is not too much to say that the recent Schneider Cup races have produced a very real diplomatic problem centering in the Mediterranean. Here, there has always been a conflict of interests. Italy has had reason to suspect whenever the countries bordering the sea have been involved in any international difficulty that Britain's trade route to India and Australia

makes it an essential link in her Imperial line of communication. France, Spain and the Balkan States all have a status quo to protect, not to mention their ambitions. All of which gives a very real value to the aeronautical prestige of the various nations. And there is where the Schneider Cup entered the field of diplomacy.

When Italy won the speed record of the world for airplanes at Norfolk, she captured the respect for her air army among the Mediterranean peoples to a maximum. It was assumed that if Italy could design aircraft that could outperform any in the world and, occupying as she does a strategic point, she could dominate the Mediterranean aeronautically. Great Britain radiantly recognized this situation and decided to make an effort to show that her aircraft were superior. She triumphed decisively and gained international prestige for her air power.

Other uses of aircraft in diplomacy could be cited and will become more apparent as the airplanes feel the effects of this new influence. It took Colonel Lindbergh's matchless popularity to bring this phase of aeronautical development to the World's notice.

Slack Period Profit

ALTHOUGH THE manufacture and sale of aircraft and aircraft equipment is a good round business from coast to coast, the aeronautical industry at times has its seasonal depressions. During the winter months air traffic in some sections of the country will not be so much as in other months. However, it should not be considered that such is the result of the cold weather unworkability of aircraft, any more than the winter storage of automobiles signifies their inaccessibility when the snow flies. Of course such applies only to private flying as the regular airlines will not suspend operations any more than will the bus lines and railroads.

Yes, on second thought, a slack period is not as disastrous to the aircraft manufacturer as it might seem. The temporary decrease in business will enable him to check up on past efforts and to make a study of existing managerial conditions within his own walls. Which in turn will serve as a foundation upon which to plan and arrange advertising campaigns, sales procedures and distribution policies, etc., to be put into effect at the beginning of the good season. In short, the slow ones will make the slack season a profitable one by doing the ground work necessary for increase of business in the near future.



One jumper off and another ready to go from a Martin Bomber over North Island, San Diego, Calif.

The Russell Parachute

A "Lobe" Type With Pack so Designed That a Pull on Rip Cord Instantly Removes Entire Covering

By J. M. RUSSELL

Designer, Russell "Lobe" Parachute

THE "LOBE" type parachute was designed primarily for military use. It was felt that a parachute successfully meeting the rigid requirements of military service would easily fill the requirements of commercial aviation. In the design and construction of the lobe parachute special attention was paid to ease of operation, simplicity and maintenance. From a military standpoint this latter item may not be as important at present. From a commercial point of view, however, it undoubtedly is essential that the parachute be able to function rapidly and positively under extreme adverse maintenance conditions.

A description of the Russell "Lobe" parachute has ap-

pears the principle on which it operates. In the open position the canopy is extremely flat across the top, with the sides curving downward and slightly under. The main supporting cords or shroud lines are attached to the skirt at bottom edge of the canopy fabric. From this point the cords remain free of the fabric until entering the canopy at the periphery of a smaller circle forming the center top of the canopy. This allows the loose outer ring of fabric, as forced, to fill out regardless of the load or tension in the shroud lines. In flying with all the tension and momentum of the canopy ring in reversed directly by the internal air external pressure acting upon the canopy.

At the start of opening the canopy ring forms a relatively slight angle with relation to the line of flight. As the opening progresses this angle of the canopy ring increases and

in the full open position the ring is at a right angle to the path of descent. Also, as the spread of the canopy assumes practically all of the movement is at a right angle to the line of flight at the same time that the angle of the ring is being increased. The canopy ring in the open position then takes the shape of a semi-circular "lobe" projecting from the outer portion of the canopy.

By reason of the fact that over one-half of the fabric area of the canopy, comprising the lobe, is not held to a given position by the confining tension of the shroud lines an extremely positive opening is assured. The accelerating load in one direction, with the resultant drag upon the canopy in the opposite direction, causes a tension upon the shroud lines resulting the opening of the parachute. In the lobe type canopy will over one-half of the resistance is dissipated. The lobe is free to expand to nearly the one-half open position during the initial opening period, at which time the load tension or has resistance is the greatest.

Normal Speed of Descent Quickly Attained

Rate of shock load upon opening is attained, due to the rapid change of the curvature during lobe, in the opening period. This gives the parachute the tendency to "buck" into its opening. The counterbalancing of this tendency is accomplished by the extremely flat top, creating a maximum drag. This causes the parachute to quickly and easily assume a normal speed of descent by not permitting an abrupt shock upon opening.

In descent, stability is attained by the counterbalancing effect of the lobe. If the load swings in a given direction, the resultant pull upon the shroud lines tends to neutralize the small center top of the canopy. The pressure acting upon the lobe causes it to lag in the movement to follow. This



A Russell "Lobe" parachute being folded before being placed in pack.

immediately dampens out oscillation, providing an inherently stable parachute.

A canopy of this type, due to its stability, is not susceptible to bucking up against external pressure with resultant spinning during descent. This action, known as "levitating," tends to promote the oscillation in constantly calm air. Lack of "levitating" together with inherent stability, permits the lobe

type canopy to descend extremely steady with the load hanging plank at all times. These characteristics cause the lobe type parachute to descend with but approximately one-half the distance of drift found in the flat type parachute. The lobe type parachute is thus enabled to land its load with



Jumper about to "split" the air out of a Russell "Lobe" parachute.

excessive shock, at the actual air speed is comparatively much lower.

In a canopy of this type four vitally important features are attained—positive opening, ease of shock upon opening, inherent stability in descent, and maximum drift.

A suitable pack, or container, has been developed for a parachute of this type. The pack is so designed that a pull upon the rip cord removes the entire covering from the parachute. This causes the parachute to be completely exposed to the air stream the instant the rip cord is pulled. Opening of this type is rapid and positive, as there is no cause for lag in take place in forcing the parachute from the pack.

Harness Adjustable for Comfort

A harness has been designed in which the seat strap is automatically held at the proper position by the action of the parachute pulling upon the main lines. This allows the harness to be adjusted loose enough to be comfortable, with the assurance that the load will be distributed properly upon the seat.

A ring four inches in diameter is attached to the rip cord. This ring fits in a pocket conveniently located on the harness at the left side. It is at all times easily accessible to the wearer.

The service type lobe parachute, as manufactured, is constructed in the seat style pack. It is intended for emergency use and no condition that might occur. The design is such as to withstand severe usage under severe conditions.

This type of parachute is also constructed of cotton fabric. The cotton seat pack lobe parachute is intended for the slower speed airplanes, such as commercial planes, military trans-

ing planes, and Primary Training planes. The cost being much less than the silk parachute, it provides an ideal knock-out parachute for ordinary purposes.

For military training use, a single harness with two parachutes attached is provided. The main parachute of this equipment is somewhat larger than the emergency or reserve parachute. This secures a very easy landing to students while undergoing training.

A built type pack is provided for those who desire a pack located in this position.

Operates in Very Short Time

To explain in a general way the principle and action of the parachute requires some little time. From this, the reader may gain the impression that, as apparently so much takes place, the parachute must fall a great distance and consume a great amount of time in its operation. For the actual operation to take place, however, requires but very little time. In performance tests at such low speeds as 70 m.p.h. with normal load, the average time required for complete operation is but one and four-fifths seconds. The reason that the parachute, from the instant of its release, must fully open, check the load, and assume its normal speed of descent.

To the air traveler in time of emergency, after leaving the plane a jerk upon the rip cord allows the action to take place. As this finds himself floating gently suspended in safe descent.

The Russell "Lebe" Parachute is manufactured at San Diego when ample opportunity is provided for tests over both military and civilian flying fields.

Among other interesting details of construction, before rigging shroud lines in the canopy each shroud line is put under

tape and is again staked to the finished skirt for a distance of not less than the width of the tape. The hole through the tape is made by a round, smooth sharp-pointed rod, and is spread, not cut.

The shroud line is constructed of the best quality long staple, western washed cotton. The cord consists of braided



Interior view of the Russell parachute factory at San Diego, Calif.

jersey only. The jacket is of medium weight and consists of not less than 120 ends. It is constructed of 24 strands, each thread five-ply, with no inner core in the jacket. The finished line has a breaking strength of not less than 250 pounds and weighs 55-65 yards to the pound.

The silk fabric is imported from Japan with these characteristics:

Tensile strength—Warp	2 1/2 lb. minimum
Pill	45 lb. minimum
Tear resistance—Warp	3 lb. minimum
Pill	5 lb. minimum
Thread count—Warp	50-100
Pill	50-100

Wt. per square yard 1.4-1.5

The cotton fabric, constructed of long staple western cotton, has the following characteristics:

Tensile strength—Warp	45 lb. minimum
Pill	45 lb. minimum
Tear resistance—Warp	2 lb. minimum
Pill	2 lb. minimum

Wt. per sq. yd. not less than 1.5 oz., nor more than 2.0 oz.

Mail Lines Serve Trading Area With Population of 62,299,409

THE 26 air mail routes now opening or to be opened in the near future, under contract or advertised, will serve trading areas along these airways, with a population of 62,299,409 people, with 79 station stops. Fifteen routes are in operation at the present time, a route mileage of 7,967. The 35 been total 11,836 mi. While but one plane each way a day on each of these airways, the daily airplane mileage more than equals the distance around the world at the equator. On one line this service is doubled. Commercial routes bring the total route distance to over 12,000 mi.

In addition to this scheduled mileage it is estimated that air service operators fly more than an equal amount in local, recreational, crop dusting, sight-seeing, photography and other commercial pursuits. Every day on the airways becomes a highway to every other, the far corners of the earth are just beyond



(a) D. A. Jones design
Bld. Lockheed, Clearwater National Forest

By HOWARD E. PLINT

Forest Service Inspector, U. S. Forest Service

DURING the three seasons, 1925 to 1927, massive, big airplanes were used by the United States Forest Service to form fire-control work in the mountainous regions of the Northwest and in California. The planes have all been Liberty-engined DeHavilland leased to the Forest Service by the Army Air Corps. Skilled personnel for the maintenance and operation of the planes and for observation work has been provided by the Forest Service with the exception of one regular Army Air Corps officer detailed for technical inspection and advice. The pilots were Army reserve men engaged in civilian flight.

The planes have demonstrated a value for Forest fire-control work in proportion to their fitness for the kind of flying necessary under adverse mountain conditions and in proportion also to the skill and experience of the personnel. At present, their principal possibility for use lies in dividing the ground forces and in furnishing information in regard to the position and movement of the enemy. Planes operate now, in any great degree, like the plane or do the work of ground forces in forest-fire control. When wisely and skillfully handled, they often can furnish information which is highly important to effective forest-fire control. With the availability of better planes and many more landing fields, they may become of great value for the rapid transport of fire-suppression men to the vicinity of the fire.

528 Hrs. of Flying Without Accident

In the Northern Rocky Mountain District of the Forest Service in particular, encompassing Montana and the southern foothills of Idaho, the planes have been extensively tested. That is, an area of very rough terrain ranging in altitude from 2,000 ft. to about 10,000 ft. above sea level. Much as it is accessible only by packhorse trails or by men on foot. One National Forest of a million acres, 1,500 sq. mi., has had 12 mi. of road, no permanent houses habitation and not six landing fields within its boundaries. There are other vast areas in that district without landing fields. A clear record of 528 hours of the forest and mountain flying, often in heavy smoke and in stormy weather, without a crash and without injury to men or equipment, is high tribute to the pilots

The Airplane in Forestry

Its Value in Fire-Control Work

and mechanics who kept Liberty engines and old DH planes ready to fly at all times.

The entire region, of some twenty million acres, is subject to summer or violent thunder storms which are accompanied by little or no rain. Lightning starts several hundred fires each season. As trees to study in 200 fires have been started in a few hours by one general storm, cleared forests are distributed with a view to catching these fires small. Look-out men, mounted with the rest of the force by telephone camp observations on many of the most commanding peaks. Their duty is to detect these fires while they are very small and report the exact location of them to the ground organization for attack. Due to the extremely rugged terrain, there are many gulches, canyons, and steep slopes not visible to any of our extensive network of lookouts. In such places fires must be seen before they are detected. A large fire is extremely difficult and costly to control. Not infrequently, a fire in such regions may require weeks of time and the efforts of several hundred men to control it. The damage in such cases may be very great.

In the discovery of small fires in these vast areas, the plane with its speed, range, and its independence of terrain



(a) D. A. Jones design
An Idaho thunderstorm in action.

may play a unique part. Regular patrol lines are not done. The planes are held in constant readiness at the most exposed points. A Forest administrative officer telephones in that a thunder storm has passed over a certain drainage and asks that it or certain parts of it be scouted by plane. On the best available map of the area a course is laid out to



Russell "Lebe" parachute pack being inspected before being sent.

a 15-ft. tension, marked to show points of attachment and cut. All cut ends are dipped in wax to hold the pack and core in proper relationship. The lines are secured to the skirt and other points by mg-ug machine sewing for a distance of not less than two inches except at the skirt. From 10 to 12 stitches to the inch are taken through the lines at these points. The lines pass through the center of the skirt

Lindbergh Flies from Washington to Mexico City

Makes 2,031 MI. Non-Stop Flight Between Capitals in 27 Hr. 10 Min.



ON THE afternoon of Dec. 26, 1927 after a non-stop flight from Washington, D. C. to Mexico City, Mex., a distance of 2,031 mi., Col. Charles A. Lindbergh landed before a vast assemblage. Leaving Bolling Field, Washington, D. C., at about 7:30 the day before, he had made a cross country course skirting the Gulf of Mexico near Galveston, Tex. He then followed the shore down to Tampico, Mex., where he cut inland to Vallarta American Field outside of Mexico City. The destination upon his arrival at the field and in Mexico City marks those which he recorded in Europe and the United States.

Colonel Lindbergh took off in the Spirit of St. Louis, the famous Ryan monoplane powered with a Wright Whirlwind engine, with a full load weighing 5,750 lb. including 500 gal. of gasoline and 35 gal. of oil. His flight took 27 hr. 10 min. or approximately six hours less than his tour from New York to Paris. With his lone continental cabin, the trans-Atlantic flight, and the recently completed Good Will Tour of the United States it is estimated that the Spirit of St. Louis has traveled over 30,000 mi. The Wright Whirlwind engine has been outlanded only once since it was first installed in the plane and that was after it had traveled over 30,000 mi.

Makes Run of About 2,500 Ft.

The take off at Bolling Field was witnessed by a small crowd. Among those present were F. Truhovec, director, assistant secretary of War for aviation and Maj. Henry D. Davis, Jr., commandant of Bolling Field. Colonel Lindbergh had spent the night before his trip at the home of Capt. Eugene Lind, U.S.N., and in the morning entered over to the field with him. There, Staff Sergeant Ray House of the 65th Army Signal, Army Air Corps, was preparing the Spirit of St. Louis for its long flight. This night before and that morning it had rained leaving the field quite muddy. After a consultation over the weather reports and an inspection of

The "Spirit of St. Louis" being prepared at Bolling Field, just before the start of the flight to Mexico.

the field Lindbergh decided to take off. The weather forecast predicted some rain and fog along the route and due to the muddy condition of the field it was doubtful for a time if it could get off with that load. After a run extended to be about 2,500 ft. he got off clearing the town at the end of it. He then circled above the field and started off toward his night planes, four belonging to the Army, three to the Navy, and one to the Department of Commerce.

Flew Blind Some of the Time

According to Lindbergh that trip was in some ways the most interesting flight he has ever made. He flew blind most of the time and in one instance he was completely lost. There was some haze at the start and on the run out at about 5:45 P.M. he had to fly blind until about 30 o'clock when the moon came up. Until then he was flying about 500 feet with his instruments. He then picked up the Gulf of Mexico and followed the white line of the coast, though he seldom hit that and flew blind until he pulled it up again. Concerned with Lindbergh's trans-Atlantic flight the night was exceedingly long. Flying to Paris he traveled from west to east and was in darkness only about five hours. On this flight he was in darkness about 20% of the time, though he seldom hit his instruments a great part of the time. Lindbergh is so used that he oriented himself at Tanganyika, Senegal by the lights of the city and then set a compass course for "Yam City." After traveling inland through the clouds he knew just how it was and until he saw a sign on a hill at Tiber

that he located himself again. A short time later he was met by a number of planes of the Mexican Army and was led to the field near Mexico City.

At the field he was met by the crowd who had been waiting in the hot sun for about three hours. In an official bus set up against the wall of a larger President Calles, Dwight D. Davis, U. S. Ambassador to Mexico and W.H. Rogers, assistant Colonel Lindbergh. With them was Secretary Alvin Winkler, the first American officer to land down a Mexican airplane during the war. There were also a number of other officials including Gen. Alberto Obregon. The crowd had been impatient and often cheered when it was rumored that the Spirit of St. Louis was on the horizon. Once the crowd was fed completely when a Fairchild monoplane landed, coming from Tampico. Upon the arrival of Lindbergh there was great excitement and soldiers and policemen were detailed to keep order. A number of motorcycles kept circling the plane after it had landed to keep the crowd away. Ambassadors Rogers and W.H. Rogers went over to greet the pilot and were almost run over by the motorcycles. While the plane was being pushed into a hangar Colonel Lindbergh went over to the official bus to meet President Calles. Later the party went by automobile to the American Embassy. Their path was cleared with bayonets on the wheels through the streets. The day was a hard holiday in Mexico City, the first legal holiday ever ordered in the honor of an American.

It is understood at the time of this writing that Colonel Lindbergh will continue on his Good Will Tour with the "Spirit of St. Louis" to Central America and Panama. He will then return to the United States by way of Cuba.

Residents of Scarsdale, N. Y., Seek To Prevent Air Firm's Operations

LEGAL ACTION to prevent flights from the field of Atlantic Airways, Inc., Englewood, distributor at Westcott Road, New Rochelle, N. Y., recently was taken by residents of Scarsdale located near the field.

One report had it that pilots of the Atlantic Airways were reported of landing, but deep into the Scarsdale residential district in violation of a recent ordinance passed to ban violation of that national delivery. Scarsdale has a warning law which has been passed from the associated section but permits occasional violations.

The aviation observers proceeded on the theory that Atlantic Airways was operating a business but were beaten in the legal proceedings, it is reported, by the maintenance that the legal provisions were of an educational nature.

Canadian Vickers, Ltd., to Produce Fairchild Monoplanes in Canada

THE CANADIAN Vickers, Ltd., Montreal, P. Q., Can. is to manufacture under license the Fairchild "all purpose" monoplane. This plane, which is described in detail in the June 16, 1927 issue of AVIATION, is an extremely low-winged monoplane carrying four passengers in addition to the pilot. All materials have been agreed, and Mr. Porter, at the Vickers Company, was recently at the Fairchild plant at Farmingdale, L. I., N. Y. to obtain all information necessary for the construction of these planes. All material is now supplied by the Fairchild Airplane Co., and final actual work can be started without delay. Vickers, Ltd. has already accepted an order from the National Defense of Canada for six monoplanes.

Nicholas-Beazley Takes Over The Distribution of Safety Belts

THE NICHOLAS-BEAZLEY Airplane Co., of Marshall, Mo., has taken over the complete distribution of safety belts of the Hilde Landing Co. and Selling Co., according to a statement made by Russell Nicholas, president of the Nicholas-Beazley Co. This is stated to make the Nicholas-Beazley Co. the largest distributor of safety belts in America and this firm is selling safety belts to a great many American manufacturers.

Safety belts are manufactured in two grades, the regular thousand Specification Belts with Government Specifications Belts, and also a regular Commercial Grade Belt with commercial type Buckles, such as is used by commercial manufacturers.

In addition to contracting for the entire output of this Safety Belt Company, the Nicholas-Beazley Company has also taken over the entire output of a duplicate factory and are distributing two grades of nylon belts, a high powered type of aerial meeting power and a lower priced commercial grade. These sales have been at the rate of several hundreds of thousands, according to Derek White who has charge of sales and advertising for the Nicholas-Beazley Company.

An Automatic Ticket Seller



One of the large airplane companies in Germany now sells flight tickets through the automatic, where one, standing in line of flight, inserts his coin and receives a ticket for the flight. It has been found that the sale of tickets in this manner saves much time and trouble.

State and Federal Rights

Massachusetts Tests Right to Refuse to Recognize a Federal Piloting License Within its Boundaries

By DANIEL ROCHFORD

DOWN IN the little town of Haverhill on Cape Cod is the First District Court of Massachusetts out of the most important legal questions affecting aviation in America today is in the process of being resolved. That question is whether a State can refuse to allow a pilot holding a Federal license to operate within its boundaries.

After a two and one half hour court argument on Dec. 2 Judge F. C. Swift threw up his hands and asked the parties to the legal action which raises the question, to submit briefs by Jan. 2 next, after which he will make his decision.

A Boston man had been arrested for operating an aircraft after his right to operate aircraft in Massachusetts was suspended by the Boy



Robert L. O'Brien, Jr., Massachusetts aircraft inspector.

scout of Motor Vehicle. The State is prosecuting him despite his defense that he held, at the time he flew the plane, a completed one, a Federal piloting license, which he claims, the State cannot suspend.

The facts of the case hardly are new. Henry Larkins, a youngster in his early twenties, flew a seaplane at an airport at the Boston Airport level spring after reported warnings not to do so. Hence his right to operate aircraft was suspended. The Federal aircraft inspectors were then and remain now silent. He applied for license, took his tests, passed them, and was granted a pilot's license early this summer. The State proceeded granting the license but due to confusion in the Department of Commerce through others at that time, no satisfactory reply was made to the Federal to the State government. From personal talk with the Federal authorities the writer learned that Larkins explained that he was the victim of prejudice on the part of the State authorities and so got his license in spite of their protest.

Soon after this Larkins was given a copy of his own as the south shore of Cape Cod. On Aug. 30 while flying from Orono to Weymouth he came up to a Curtiss Biplane flying down by pilot Harold O. Crowley of Weymouth. The

story as gathered from talking with Crowley and men who insured the two pilots afterwards, was that Larkins came abreast of Crowley's right wing and then suddenly dropped his left wing as though to dive down on Crowley. It was a rather thick fog and the two planes were not more than 200 ft. above the water.

What happened then is a matter for conjecture. Crowley thinks Larkins' plane got in his propeller wash and landed up against his tail. At any rate Larkins went down out of control into the water, wrecking his plane and seriously injuring himself. Crowley felt the crash and his aircraft wouldn't respond and he settled early to the writer with the tale of his plane almost broken off.

But the accident brought State Aircraft Inspector Robert L. O'Brien flying to the scene from Boston. The writer happened to accompany him. Larkins' condition was so critical that his trial was postponed until Nov. 30.

That day O'Brien, who has studied law and is intent to take his examinations for admission to the bar, was to fly to Barnstable from Boston to prosecute Larkins. For the first time on Cape Cod history a court was delayed by fog. Mr. O'Brien couldn't get through from Boston and Deputy Motor Vehicle Inspector Charles Diamond of the Hyannis office acted a continuance until the next morning when Judge Swift presided.

Federal Government Not Active in Case

Larkins was represented by an uncle. The Massachusetts aircraft law, based on Chapter 80 of the General Laws beginning at section 35, provides that pilots must be licensed by the State with certain exceptions. Section 31 (Acts 1925 section 138) says "No such license shall be required of any person licensed by competent Federal authority". On this Larkins based his defense.

Section 48 reads, "The register may suspend, or after due hearing, revoke, a pilot's license . . . upon the use by the pilot of an unsuspended aircraft". This was the reason for the suspension of Larkins' right to fly as pointed out above.

The Federal government is not active in the present case. If Larkins wins, the State has no further recourse except its legislature. However a bill is already drawn for the present session of the legislature to give the Registrar of Motor Vehicles the power to suspend all private licenses for cause. Hence Register Crowley feels that it is not material whether the case is won or not.

If Larkins wins the decision, then the whole matter will create a future prosecution after the State laws are changed specifically allow such suspension, which, in appeal, will raise the same question whether a State can refuse to recognize the Federal piloting license, or can suspend its authority in that state.

If Larkins loses, we understand, he will appeal. The question is one of conflict of laws involving a problem that is

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Federal and perhaps the Supreme Court may have to pass upon it, settle.

The writer has talked with Maj. Clarence Young of the Federal aircraft laws and he has answered Massachusetts of its Department of Commerce's cooperation in aircraft laws in the future. Federal Inspector Winthrop O. Sargent, now assigned to Massachusetts, is a happy appointment as regards any conflict or conflict in legislation. He formerly was a State Inspector and handled western Massachusetts for Boston or sometimes while O'Brien handled the eastern part of the state.

Sargent "refused to meddle" in the Larkins trial, not even attending it. Apparently the Department of Commerce will await the action of the lower court. Assistant Secretary Mac-



Winthrop O. Sargent, Federal aircraft inspector.

Creighton has said nothing about the Federal regulations are only to cover interstate flying. And recently when a Gloucester man told him that the boy trying to fly on a suspended license, he himself having a pilot's license. The Inspector Sargent kept away from the case saying it was not a subject for the Federal inspection.

Of course there is a great deal of flying kept within Massachusetts, in the feeling of the State authorities that they should be able to control this. The Federal government does not deny the reason of this. Yet the question of suspending a Federal piloting license past beyond partly invalidate it.

The writer sees no reason why a small pilot coming in from out of the State could not have his license suspended for cause and so be unable legally to fly into or out of the state. The effect of this power could not be limited merely because a flight carried a man beyond the bounds of the state.

Creighton of the state's writer again being quoted, as in the Larkins case, was talking of regulations. The statute now makes the piloting license records from Washington as they are printed and every possible cooperation is the work of inspectors. However O'Brien feels every holder of a Federal license who reports to fly in Massachusetts, should apply for a state license too. He would give this opinion to holders of Federal licenses. Of course at present a state license costs a man 35 whereas the Federal license is gratis. But this is a detail which can be settled. However the law case is not in really depend of the whole country, or at least the aviation status of the country should wait the results of the decision of next January and the events which follow it.

Please Note

THE INDEX to volume XXIII of AVIATION, July to December, 1937, is now ready for distribution. A copy of the index will be mailed upon request. Address envelope to page, c/o AVIATION, 250 West 57th Street, New York City.

AVIATION

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Europe to South America Air Mail Service to Start in January

THE DEPARTMENT of Commerce has stated that according to plans being made by a French company in Montevideo, air mail service between Europe and South America will be started in January.

The Department's statement follows: Air mail service between Europe and South America by the Cie. General de Transport Aeronautique, Lignes Latines (French air company) in Montevideo, will be started in January, reports Commercial Attache G. C. Brooks.

The mails are planned at first to be carried by airplanes, land planes and steamships but the operators are said to hope to be able, after a short time, to establish an air-air route between continents.

The tentative time schedule between Paris and Buenos Aires is as follows: Fly land plane from Paris to Casa Blanca, 13 hours; Casa Blanca to Saint Louis, Brazil, 1 1/2 days; Saint Louis to Cape Verde Island by airplane, 3 1/2 days; Cape Verde to Pernambuco by airplane, 1 1/2 days; Pernambuco to Fortaleza de Natal, 1 1/2 days; Fortaleza de Natal to Rio de Janeiro, 1 1/2 days; Rio de Janeiro to Montevideo, 1 1/2 days; Montevideo to Buenos Aires, one hour. The route, assuming 7,700 miles, is said to be the longest air line in the world.

Veteran Railway Mail Clerk Files First Air Mail Clerk Application

WALTER G. Tushnet, of Omaha, Neb., and a railway mail clerk for the past 22 years, has the distinction of being the first to make application as an air mail clerk. His application was received recently by Assistant Postmaster Volney D. Irving, Omaha, in immediate charge of Air Mail Service.

"Anticipating the time when air mail will be distributed on routes," says Tushnet, as his application to the Department, "I wish to enter myself as a candidate for air mail clerk."

While air mail, at present, is not distributed on routes, the great strides that have been made in this service make it possible that in the near future air mail clerks will be employed for such duty. In such event, Tushnet's application will receive the consideration by the Department.

Ryan Brougham is Used to Carry First Mail Over Alaskan Route

A RYAN Brougham manufactured by the B. F. Mahoney Aircraft Corp. of San Diego, Calif., and piloted by Andrew Crickshank, a San Diego pilot, carried the first mail of arrival to the new Alaska service established between Mayo, Whitehorse, and Dawson, according to a letter received by the Mahoney Company.

The Alaskan government has purchased the Taylor Airways and Express Company in order to operate a 25-cent air mail stamp which is the postage required for all letters carried by airplane between Mayo and Dawson.

Mr. Crickshank reported that his air mail flight of 300 mi. from Mayo to Dawson via Whitehorse was made in a day and 20 hrs. in a southerly direction averaging 28 mph. The same trip, he asserted would require 34 days by ship or 18 days by dog sled.



Star quarter view of a Vought "Corsair" buoy on the water before taking off

The Vought "Corsair"

Navy Tests Show Production Type to Have a Better Performance Than First Experimental Planes

THE FIRST "Corsair" to come off the production line at the Chance Vought Corp. plant in Long Beach City, New York, was delivered to the Naval Air Station at Rockaway, N. Y., recently and was put through the trials and tests required by the Navy Department. It was flown by Lieut. John W. Jones, U. S. N., commanding officer of the Air Station and by Lieut. Louis A. Blum, U. S. N., naval inspector at the Chance Vought factory. The plane easily surpassed all test requirements. The "Corsair's" remarkable flying characteristics were well demonstrated and the new plane showed an even better performance than the first experimental planes. It repeatedly took off in five seconds, a record for a fully loaded service airplane.

Has Superior Characteristics

It is claimed that these flight tests showed the production type "Corsair" to have characteristics even superior to the original planes of this type, one of which, within a short period, established four World's airplane records without special grooming and after being in active test service for over six months. These records had been previously held by Parnes and Doby with specially prepared planes, and were beaten by such margins by the Vought plane. The "Corsair's" record-breaking performance are all the more striking as a stock plane and engine was used without re-engineering.

The military performance of this new "Corsair" airplane is claimed to be superior to all other planes of its type, and

according to official records, its all-around performance at service altitudes even exceeds that of the service type airplane carried planes of the Army and Navy, including the latest Navy experimental fighters. To quote a high ranking Naval Officer, "The Vought 'Corsair' about the Pratt & Whitney 'Wasp' engine is something of a revolution. Its all-around performance as a two-seater with 300 pounds more useful load than the single-seater, shows only a half dozen miles of reserve high speed at sea level, whereas in point of climb,



The first production-type Vought "Corsair" at the Rockaway Naval Air Station for Navy Department acceptance tests.

climb, maneuverability and altitude performance including speed at altitude, it is superior to the single-seater."

The "Corsair" is one of the world's most versatile airplanes. It includes many novel military ideas, including the location of machine guns remote from the cockpit or arranged that when the cut flow through the propeller blades. It includes side landing gear of either the land or water type may be used to the "Corsair," and later it is to be supplied with amphibious type gear. Landing gear is provided for landing on the decks of the new aircraft carriers U. S. S. "Barr-



Side view of the Vought "Corsair" high-performance all-weather-fighting plane.

top" and "Langston," and it may be equipped from the hulltops and cranes. Radio is provided for observation purposes, and being extremely maneuverable and possessing remarkable performance, with its armament, the "Corsair" is deemed well able to take care of itself in its Naval assignment. Due to the inherent efficiency of the plane and the Pratt & Whitney "Wasp" engine installation around which the "Corsair" was designed, the plane is also an excellent cross-country type.

The Chance Vought Corp., builder of the "Corsair," is one of the oldest and largest manufacturers of aircraft in the country. A large quantity of these planes are being built for use throughout the U. S. Naval and Marine Corps Air Bases. Chance M. Vought, the head of the company, is one of the country's oldest fliers, being a protégé of the Wright Brothers.

Example of Vought Leadership

The production of the "Corsair" is but one example of the leadership of Vought in the aircraft field. The first Vought product, the V-17 training plane produced in 1915, had such perfect characteristics that many of them are still in service. Likewise, each of the other succeeding models down through the famous Vought O-5 series have with, because of the splendid flying characteristics and outstanding performance, enjoyed a long popularity and rapid selling service job. The Vought company was the first to adopt an eight-cylinder engine exclusively for its planes, which strength has been immediately verified by the recent long distance flights. One Vought was closely connected with the development of the "Wasp" air-cooled engine; the Navy Department, Chance Vought Corp., and Pratt & Whitney Aircraft Co. worked in close cooperation on what was one of the first jet airplane projects in which the engine and the plane were really designed and built for one other to meet the jet requirements of one of the Navy's most important aerial projects.

Embry-Riddle Co., to Use Waco Planes on New Air Mail Route

WITH THE most recent acquisition of the Chance-Crossair control air mail line, the Embry-Riddle Co. of Cincinnati, O., stepped into the ranks of air line operators, carrying mail, passengers and express.

Recently the postoffice department granted the company the contract on its bid of \$147 a pound. It is believed the mail will eventually be of considerable volume since Cincinnati is the gateway of the South, and admirably situated to handle all of the South's mail bound for the North and West.

Waco planes with Whitehead engines will be used in the transportation of the mail, and a Ryan Brumfield used in passenger traffic throughout the routes. After the first newspaper announcement of the opening of the line, reservations were made on the line at the tentative price of \$25 or \$35 fare one way.

The schedule as worked out for the winter months is claimed to be exceptionally good for passenger travel between Chicago, Indianapolis and Cincinnati. The plane leaves Chicago just after the arrival of the east bound transcontinental plane, or at about 7 o'clock, Eastern Standard time, which is the time on which Cincinnati operates. This would enable the Chicago business man to arrive in Cincinnati in time for the opening of the business day, and would give him an hour in the Ohio city. The plane will leave Cincinnati at about 2 o'clock during the winter months and reach Chicago three hours later. This trip takes the place of an overnight journey by train.

Consolidate Work of Bureau of Foreign and Domestic Commerce

A RECENT report from the Bureau of Foreign and Domestic Commerce of the Department of Commerce states that all secretariat work of the Bureau of Foreign and Domestic Commerce has been consolidated in the Communication Division of the Executive Secretariat. The consolidation and dissemination of information as secretariat or foreign countries will be continued and the sales promotion work formerly done in the Automobile Division will be done by the same personnel in the Transportation Division. It is expected that the continuing of all secretariat work will make possible better service to all interested Americans. Every effort will be made promptly to supply information and any other possible assistance to exporters of aircraft equipment and those in need of information on developments in foreign countries.

Navy Issues Monthly Chart on Weather over North Atlantic

THE HYDROGRAPHIC Office of the Department of the Navy recently prepared the first pilot chart of the upper air dealing with the meteorological conditions over the North Atlantic. The chart which sets out the best route to be followed by trans-Atlantic fliers for the month of December, is the actual analysis necessary about to be prepared for regular use by the Hydrographic Office and which will be issued every month. The data appearing in the chart is based on observations of the United States Weather Bureau.

Aviation Insurance

Some Instructive Information on this Important Subject Given In Question and Answer Form

By C. C. VICKREY

WHAT GENERAL questions pertaining to airplane flights are on all applications for life insurance?

(a) Have you ever engaged in any form of aviation?
(b) Do you contemplate engaging in any form of aviation?
Does a life insurance policy cover flights made as a passenger?

Fifty of the leading life insurance companies have answered that as to passengers by going on record as placing no restriction on participation in air travel. Policies of other companies will also cover passenger flights when there is a clause contained therein, specifically exempting such liability, or, unless the policy-holder makes false statements on his application for the insurance concerning his past and contemplated aerial activities. This last would be a simple breach of contract, since the application forms a part of the life insurance policy, and, as the record of an aviation liability, the insurance company could not deny payment. The burden of proof would be on the company.

Does an accident policy cover flights made as a passenger? Most companies state in their accident policies that the policy holder is covered only while "riding as a passenger as a licensed aviator, operated by a licensed pilot, upon a regular route between established airports." Unless the policy specifically restricts or excludes aviation flights, with some such clause as above, the policy is binding.

The same point should be noted as to statements made in the application also applies.

Does a life insurance policy already in force cover anyone who changes his occupation and becomes a pilot, or flies as a passenger?

Yes, unless specifically excluded by a clause in the policy. However, with most companies this exclusion clause will not restrict your flying after the first two years. Branch of concern as to statements made in the application again applies.

Does Overseas life insurance cover airplane flights?

Yes, no restriction whatever.
Will life insurance companies accept those who make frequent passenger flights?
Some companies will. They usually demand full information as to the nature and frequency of the flights. If only occasional flights are made, no extra provision is charged. Five or six flights a year, or more, will generally involve the payment of an extra premium according to the present practice of most companies.

Will accident insurance companies accept those who make frequent passenger flights?

Yes, subject to the occasional flying restrictions mentioned in answer to question No. 2.

Can an accident policy be taken out to cover a particular passenger flight?

Yes. Rate is \$5 per \$2,000.

Can personal accident policies be obtained by pilot?

Yes. Full information must be furnished, and a special rate is then given.

Will life insurance companies accept pilots?

Yes. Many companies now accept pilots, but charge an extra premium.

Can a life insurance policy be taken out to cover the pilot on a particular flight, or series of flights?

Yes. The Gringebach Foundation took out such a policy covering Lindbergh on his tour of the country.

How much is the extra premium charged by life insurance companies on the rate of pilots?

The extra premium usually runs between \$50 and \$75 per year for each \$1,000 of life insurance. For example, on age 30, the average annual rate for Ordinary Life would be around \$57 plus the surcharge for pilots of \$13 to \$25, depending the total cost to from \$72 to \$82 per \$1,000.

In this extra premium (surcharge) again discontinuing flying?

With most companies it is. If this point is not covered by a clause in the policy, an amendment can be obtained from the company covering this contingency.

In this extra premium for pilots ever refunded for the years when no flights are made by the policy holder?

Yes. Some companies will issue such a clause to aviators who make only occasional flights.

The New Pilot



Louis Oscar Gaudin who has been referred by Mrs. Frances Wilson Gaudin to pilot her Alouette aeroplane "The Alouette" on a trans-Atlantic flight to be attempted on the near future.

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Want special information to required of pilots by life insurance companies before granting rates?

A special form, in addition to the usual application, is required. This form requires full information as to total number of flying hours, flying hours last twelve months, year when last of flying hours, type of plane, direction of flight, usual flying, test flights, accidents, hazardous enterprises contemplated, and in special cases, even further information.

Can life insurance policies be issued subject to approval? Policies may be issued on thirty days' approval, but are not in force until the first premium is paid.

In these any limit as to the amount of life insurance aviators can obtain?

No, provided your financial standing warrants the amount. Many companies specify a limit of \$10,000 but by applying to other companies, additional insurance may be obtained. Mr. Falden carries over \$200,000 of life insurance.

Can a group policy be obtained covering all the pilots employed by any one company?

Yes. One air transport company has a policy covering all their pilots for \$48,000 each.

Can money be borrowed on a life insurance policy?

All life insurance policies, except term contracts, have a cash or loan value after a period of from one to three years. The amounts borrowable are shown in a table contained in the policy.

Does the "Double Indemnity" life insurance clause cover aviation accidents?

Yes, unless such accidents are specifically exempted by a clause in the policy.

Does the "Total Disability" clause cover aviation accidents?

Yes, unless specifically exempted by a clause in the policy. Most companies are now getting such an exemption in their new "Total Disability" clause.

Do any life insurance policies include full payment in the event of death due to military or naval service in time of war?

Yes. A few of the leading companies specify that only the premium amount of policy and not the full amount of the policy, will be paid in the event of death in time of war due to Military or Naval Service.

What is the best procedure to follow in taking out life insurance covering flights?

Have an experienced insurance broker or agent submit the full information (see question No. 15) in your case to the different life companies covering aviators. From the quotations received, you can then readily decide on the company, or companies, you wish to name with. Next arrange with your broker to speak for a medical examination and for the filing out of the necessary application. You can then pay the first premium and have the insurance in effect immediately, provided you are acceptable to the company. Or, you can have the policy issued on approval. Then after reading if over, and satisfying yourself that none of the clauses work to your disadvantage, you can then have the policy put in force any time within thirty days by paying the first premium.

Aluminum Alloy Called Neomallum Developed by German Metallurgist

IT WAS recently reported that Dr. Max Warnecke, who occupies the chair of metallurgy at the University of Munich has developed a new aluminum alloy that weighs no more than aluminum and can be rolled and moulded without loss of strength. It is said that the strength of the alloy, called "neomallum", is not affected by temperatures up to 500 deg.

New French Three Engined Metal Plane is of Interesting Design

THE SOCIETE pour la Construction d'Aerone Metalliques or "Aviatco" which is located at Courbevoie, France, recently finished a three engined transport plane (A.V.M. 132) built entirely of metal. The company claims that this is the first all metal transport plane to be built in France. The metal used is "Alufrenco" a light aluminum alloy containing boron and brought out by the Reichsmetallurgische



Side view of the Aviatco (A.V.M. 132)

Schneider. In general arrangement the plane somewhat resembles our own three engined superchargers, with the important exception that the wing is divided in two parts, and that the empennage structure is reinforced by struts which run from the bottom of the fuselage to a point near the outboard engines. The struts are also worthy of note as they extend the whole length of the wing.

The controls are direct through push and pull rods and the surfaces are subordinated. The vertical stabilizer is adjustable in flight, but the horizontal stabilizer apparently can only be adjusted on the ground. A rubber ring type of shock absorber is used. Three air cooled nine cylinder Renault type 825 engines are used. These develop 350 hp. They are positioned in the wing and also on the engine nacelles. The nacelle is 12 ft. 9 1/2 in. long, 5 ft. 3 in. wide and 5 ft. 21 in. high. It is fitted out alternately as a single cabin with ten seats or as a double cabin with sleeping accommodations.

The following are dimensions of the plane:
Span 72 ft.
Length 47 ft.
Height 12 ft. 4 in.
Wing area 750 sq. ft.
Total horsepower 1,050 hp.
Weight empty 5,500 lb.
Weight of crew 550 lb.
Weight of fuel 1,500 lb.
Pay load 3,000 lb.
Total maximum weight 10,050 lb.
Wing loading 14.5 lb. per sq. ft.
Power loading 19.08 lb. per hp.
High speed 215 m.p.h.
Cruising speed 185 m.p.h.
Time to climb to 6,500 ft. (2,000 meters) 29 min.
Climb 12,000 ft.
Range at cruising speed 500 mi.

Welding in Airplanes

Abstracts From a Paper Presented by R. M. Mock at the 1927 Convention Of the International Acetylene Assn., held in Chicago

THE PRIMARY members of the metal airplane structure are joined by welding, riveting or bolting. Welding will give a light joint that is strong in practice and maximum and which an airplane has been proven to be strong enough to be safe under all conditions. Today welding is confined only to certain portions of the airplane structure, though it is regularly being adopted for nearly all other parts. Practically all of the airplane manufacturers hold in the acetylene process and to the writer's knowledge there is only one American manufacturer using welding on a production basis.

The superiority of metal over wood for airplane structures is now accepted and a metal fuselage is general practice today. One of the first metal fuselages was built in 1901 by Anthony R. C. Fokker using an all welded structure with wire mesh bracing. The experiment and heavy lifting with the members and wires led to it was entirely discarded. At the start Mr. Fokker met with considerable opposition and it was not until several years that welding in aircraft has been generally accepted as good practice. And, even today welding is needed in the primary structure by many manufacturers abroad and a few in this country.

The first Fokker fuselage had the tubular members joined constructively and butt welded together. There are many manufacturers who expect to build members for structural members and replace them by extruded angles, "T's," "U's," channels, etc. Others use light gauge metal angular dimensions, built up into sections to give the required strength. With the latter type the members are often stressed and therefore of wood or metal. On the German Dornier planes that construction is used by having flange channels placed lengthwise on the outside and at right angle to those on the inside.



The fuselage of the Spirit of St. Louis built by the R. F. Mahoney Aircraft Corp. The truss is entirely of tubular members with no over bracing.

The result is a three subdivided into small rectangular areas. Bonded steel tubing, because of its strength under small loads, has been adapted for aircraft construction extensively through some rectangular sections are used. Fabrication Aviation, Inc. has been quite successful with square section alloy steel tubing. The members are approximately one inch square with rounded corners. The structure is a normal truss employing square section tubing for supports and cross members, with round section tubing for most of the diagonals.

It is claimed that this type of construction using square tubes is very economical to the cost of preparing and fitting the members for welding and assembly is materially reduced.

The forgings are mechanical cross as far standard practice only some tubing is used, few designers build or test the tubes together though the majority depend upon welding. When welding is avoided and rivets or bolts are used it is usually advantageous in reducing dimensions because of its lighter weight. To successfully weld dimensions and still save the structural strength would reduce the weight of air-



A portion of a Pictone fuselage using square section steel tubes welded together.

plane structures considerably. Since this is not possible at this time, it is more economical to use welded steel tubing. It has been found that by riveting dimensions tubes together a reduction in weight of 20-30 per cent, over the welded steel fuselage can be obtained. The additional expense of riveting and special fittings does not warrant its use in commercial work except perhaps on very large scale production.

Wing With Welded Steel Spars

In the structure of the airplane wing we have an entirely different problem. Because of the nature of the wing it must be about flat and therefore cannot have a deep truss in the direction of the greatest loads (which are perpendicular to the plane of the wing). Similar to the fuselage, the wing structure is built both of truss, covered with fabric and being no stress or with this metal or plywood taking part of the load. In the latter type the covering acts as a tube but unfortunately the fabrication is difficult and expensive. Most American commercial airplane wings are of wood though lately recently wings have been developed with open or steel tubing welded into a Warren truss. To these span dimensions ribs are riveted. The U. S. Army Air Corps recently awarded a heavy bomber using this type of wing. The plane is very similar to our built a few years ago with wooden wings and it was found that there is an appreciable difference in the weight of the wood and welded steel wings in favor of that of metal. At the Kirtland Aircraft Corp. an experimental wing was recently completed for the Army Air

Corps having metal upper construction. That is there was a number of steel tubes running the length of the wing, as spars, and braced by a staggered lattice work of tubing welded between them.

For the popular commercial planes the only steel used for the wings is in the highly stressed parts such as the fuselage, floor beams, main spar and the struts. In most cases these members are built up of parts welded together and heat treated before installation in the airplane. Sometimes the compression members between the spars are welded into a truss of tubes. The mounting for the hinges of the ailerons is often of welded steel tubing fastened to the spar fittings.

Welded Steel Tail Surfaces Common

The tail surfaces of the airplane are designed to withstand a greater load than that on the wings and therefore they must be proportionately heavier. The structure of the tail is similar to that of wing using spars and ribs. It has been found most economical and is standard practice in this country to build tail surfaces of welded steel tubing. The structure usually consists of large diameter steel welded spars with the tubing in place. Small diameter tubing forms the web of the structure and is welded to ribs of the same material or of sheet steel stamped perforated with lightning holes.

Welding on the structure of the under carriage or landing gear of the airplane has been used for some time. The portion of the airplane structure which carries the under carriage, must be one of the most reliable. The landing gear was built in parts, heat treated after welding and then assembled giving exceptionally high strength. The same is



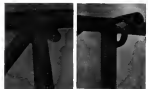
End view of an experimental multi-spar wing using welded steel tubes, designed by the Kirtland Aircraft Corp.

possible for other parts of the airplane structure such as the tail steel and engine mount. As these parts often give the most trouble they are usually readily detachable which simplifies the maintenance after heat treatment.

Another part of the airplane structure that is only recent years has been welded is the control system. In airplane design the tendency is toward push rods or tubes replacing flexible cables. It has been found possible to weld a sleeve to each end of a tube and hook the sleeve to the control mechanism. As the Army Air Corps specifies "there shall be no welds in the control system under tension whose failure would probably wreck the airplane." This is advantageous since the weld between the sleeve and the tube is in shear, rather than in tension.

The first welded fuselage (built by Mr. Fokker in 1901) was of the wire braced type. At first there was considerable difficulty with this wire bracing high tensile strength wire was used and often with a factor of safety of 30 the wire would fail even on normal level flight. It was found that the wire did not depend upon the material used for the wire bracing and in the way the wire was built at the fitting. By replacing the high tensile strength wire with a more flexible wire the problem was solved. Today Mr. Fokker is using a new type of structure based with piano wire. Double wire of piano wire now used with a single steel wire linked through the websockets at each part and connecting each end of the wire to the same websockets.

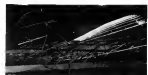
Various methods of attaching the wire to the joint have been used. At first a plate was welded to each side of the joint with the ends of a turnbuckle pressed between them. This was replaced by a single plate in the angle of the joint with the female end of a turnbuckle slipped over the plate and finally replacing the wire by a turned. The type of anchorage



Left—a typical joint with anchorage for the attachment of a turned or turnbuckle. Right—a joint on a Fokker fuselage with websockets of steel tubing welded on plates.

that is used on Fokker planes is a small quadrant of tubing welded in the corner with the wire being linked through the quadrant. Mr. Fokker has suggested that a ring would be put in well welded into the corner making a terminal for the wire and at the same time reinforcing the joint. Most designers aside from Fokker who use a bonded welded frame employ tie-rods for bracing rather than piano wire.

With the use of tubing for aircraft construction it is only natural to have the tubes meet constructively where a joint is being made. When there is no weld attached to the joint common practice is to have a plate butt joint though some designers prefer to have one or more reinforcing plates. A steel plate is often welded on each side of the tube or in the angle between the tubes. The latter, with the plate in the plane of axis of the tubes, is perhaps the simplest type



Tail group of the American Eagle using welded steel tubing.

of reinforcement and is adaptable for the attachment of an undercarriage by drilling a hole in the reinforcing plate. This position may be varied by cutting slot in each tube and having a plate go through the slot in the tubes, thus making provision for a fitting on the other side where the plate comes through. This is quite strong though the expense of cutting slots in the tubes does not always warrant its use. Another method is to wrap a piece of sheet metal around the joint and weld it into place. Still another practice in reinforcing welded joints

has been to have flat plates welded diagonally across the angle of each joint through away from the original weld. Often the plate is split at the ends having each end wrapped around part of the tube giving a greater length to the weld. This



A repair joint in a Bessie monoplane showing split and welded tubing.

is quite expensive and the cost may be somewhat reduced by having two light plates welded together in the middle rather than split at the ends. This practice often has the disadvantage of having a weld between metals of different hardness, and it also requires more labor in preparing the plate than bringing up the cost.

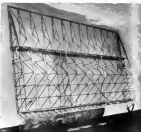
Sometimes at such positions it has been advantageous to split the ends of the tubes and flatten them and. Then flat plates, which is really part of one tube, can be used as a reinforcement for the joint by welding it to another tube. This type of joint was used on the Bessie monoplane that was recently flown from San Francisco to Kansas.

The splitting of tubes is still another problem. There are two general types of splits used, one for joining tubes of the same diameter and the other for joining tubes of different diameter. A butt weld, reinforced in one way or another, is usually employed when joining tubes of the same diameter. Butt welds subject to direct tension or bending stresses are to be avoided unless the joint is reinforced. There are many methods of reinforcing butt welds, the most common of which is to insert a third tube made of the two tubes to be joined. Other methods include welding plates of various sizes and shapes over the outside of a plate butt weld or by cutting a slot in the tubes and inserting a plate through the tubes and then welding them together.

When the tubes are of different diameter it is often possible, whenever time, skilled men take part in the work. The most common joint in the "kink-hole" in which the end of the outer tube, instead of being cut off square, is cut in the form of a "Y" with the angle between the welds and the axis of the tubes not more than 30 deg.

Because the "kink-hole" type of joint just mentioned there are other methods of telescoping tubes. The outer tube may

one half removed. This produces a "stepped" weld with part of the weld parallel to the axis of the tubes. Still another method is to have holes in the outer tube and weld around the edge of the holes. These holes must be very large or the outer tube will not resist sufficient load for the proper tension between the tubes. It is to be recommended that repairs be made in the vicinity of a joint as the structure is more rigid at this point. Recent tests made in Germany (described by Van A. Reddick in *Zentralblatt für Flugtechnik und Motorluftschiffahrt* for Sept. 16, 1937) indicate that a butt joint with plates welded to the outside in the most practical under tension though it is somewhat better for most failures. The tests were made with both experienced and inexperienced welders and it was found that with good weld on the plate butt joint is almost as good as the reinforced joint since the annealed area is less. A reinforced joint is advised when the welder is inexperienced. When the tubes are telescoped, according to the report, the strongest possible union is obtained when the outer tube is cut at angle



A wing panel built by the Keystone Aircraft Corp. using square butt up of welded steel tubes and ribs of welded duralumin.

to the axis of the tubes or preferably with and coming to a point, the angular ribs meeting a point, in form of "fish-tail". The latter types require very precise fitting which is costly. The best of them, though, and always the cheapest, are when the welds are long and at a small angle to the axis of the tubes.

With the advent of making and of taking the possibilities of the aircraft designer were increased. It is now possible for a number of members to meet concentrically at one point, though there is some tendency to have too many members in the joint and thus reduce the strength of the assembly. By having walls overlap there often results at the joint a cutting of stress welding not as well as an annealed joint.

A common fault is to have large differences in the thickness of the materials to be welded which, besides being a poor design, results in a poor weld. The U. S. Army Air Corps has a few definite rules regarding the design of welded joints some of which have been quoted. It is usually desirable to have welds under direct compression and their due to being sag rather than under direct tension, tension due to being

in shear due to tension. A weld in tension, the failure of which would probably wreck the airplane, is not permitted in any under special conditions.

A great deal depends upon the workmanship in the weld. All welds for aircraft must be perfect and most manufacturers improve their upon their employees by occasionally giving some rules to the airplane—they are building. Still, a thorough method of inspection must be used. A flat weld in a joint weld and if it is not perfect it is immediately apparent by inspection or irregularities in the weld. A faulty weld usually results in bending and irregularities. A joint may be inspected after welding and if the semi-circular surface is regular it is usually passed upon. An excellent method for inspecting welded joints has been employed in other fields. The inspector carries a lamp which he holds about two or three inches from the joint holding the members in a dark room. The welded joint appears as a dark line in the heated red area. A defect is immediately apparent on a thin plate or surface in the weld, which should be dark, as "red up" following a defect. The inspector then reflects a light with his hand so that the faulty weld is marked.

Non American Fastenings Welded

Today metal is universally accepted as superior to wood for airplane fastenings construction and for the construction of non American wings. In a recent analysis of commercial American airplanes now being produced it was found that 4 per cent were welded steel fastenings and in most cases welded steel backing gusset, splices and tail surfaces, besides many welded fittings. Though welding is confined to tubular members for the trusses, there is some tendency to use welded joint sheeting.

Welding is very economical for many reasons. It is so little that it allows almost unlimited possibilities in design welds being cheap in production. The time and cost to produce a welded steel fastening is very low, yet producing a structure that is simple, light, and most of all safe. Fastenings



Main structure of Fokker "Descent" built entirely of welded steel tubing.

are based to a minimum and in most cases eliminated. By the use of gas the assemblies can be made indestructible with very little effort and expense the design may be improved. This is especially applicable to experimental designs

where the structure is constantly being rearranged. Besides being low on the cost of production, the maintenance and repair on a welded fastening is very convenient. Wire may be clamped down away with parallel adjustments. These joints are readily, accessible and welding shows as regular wear that permits the repair being easily made. Repairs are very cheap, after the failure of a member in a welded structure the tube may be cut out and a new member very easily welded into place. Welded joints are clean and easy to inspect and their appearance has some psychological effect upon pilots and passengers.

In case of an accident the welded type of structure is comparatively safe. The fastenings usually hold in general shape and though the tubes often bend the joints seldom fail. The shock is broken by the bending of the tubes rather than the splintering of wood members that are apt to catch fire. There are many pilots and passengers who use their lives to the reliability of the welded fastening structure.

In conclusion it might be repeated that welding is now practically confined to tubular members though there is some tendency towards building trusses of pressed sheeting. The advantages of welding are generally accepted and it is believed that on larger airplanes are built, and every indication shows that this time is not far off, welding will be used in all of the major assemblies. And, as production on smaller airplanes is increased, welding will be in still greater use with the entire structure being heat treated after welding.

Italy Reported Building Plane For Rome-N. Y. Non-Stop Flight

IT WAS recently reported that there is under construction in Italy an airplane that will attempt a one-stop flight from Rome to New York next spring. It is being built by Gianni Caproni, and is proposed with engine developing a total of 1600 hp. Caproni, it will be recalled, was the builder of the famous Caproni bombing planes.

It was also reported that Italy is working on a number of commercial airplanes that can be readily converted into military craft.

Pilots and Navigators Wanted By Company in Bombay, India

THE AERONAUTICAL Chamber of Commerce of America reports that it is in receipt of advice that the Eastern Commercial Co., Nagpur, Madhya Pradesh, India, is looking for pilots and navigators. The company requires the services of about 20 pilots and navigators, and about 10 mechanics of broad experience, holding licenses of the Department of Commerce. These interested should communicate direct with the Eastern Commercial Company for further details.

Manufacturer Buys Majority of Stock and Changes Firm's Name

CLYDE V. CESSNA, president of the Cessna-Ross Aircraft Co., Wichita, Kan., has purchased a majority of the stock in the company held by Victor Ross, secretary, and has changed the firm name to the Cessna Aircraft Co. Mr. Cessna purchased the stock when Mr. Ross found his business interests in Omaha, Neb. developed too much of his attention for him to continue indefinitely in his capacity as company secretary. Mr. Ross, however, will retain his directorship in the company.



The fastenings of a Curtiss P-36 wing provide for bracing.

be cut off perpendicular or at any angle to the axis of the tubes. This puts the weld in shear and by decreasing the angle of the cut the length of the weld may be increased. Another method of telescoping is to have the outer tube cut off square, then split a slot down the tube through its axis and

Airplane Radio Sets

An Outline of the Fundamental Principles of Radio Design as a Guide in the Purchase of Proper Equipment

By LAWRENCE A. HYLAND

Radio Engineer
Article Four

THE DESIGN and manufacture of aircraft radio equipment is an art in which the ordinary radio problems are complicated by the requirements of weight and space. Delicate masses and miles replace the undisturbed ponds and feet of the ground radio installation. Only by the most arrangement of carefully designed parts is it possible to combine compactness with efficiency.

Certain fundamental design principles have been evolved during the ten years in which radio has been used extensively on aircraft. As a guide in the selection of proper equipment the most important of these principles will be outlined below.

The aircraft engine furnishes the power by which the radio generators are operated. Propellers, gears, belt drives, etc. are merely coupling devices which connect the generator to the engine. The overall efficiency of the aircraft radio transmitter depends very largely on the correct choice of coupling between the radio generator and the main engine. Furthermore, the adaptability of the transmitter to emergency circumstances is almost an essential feature of the power source as it is of the generator. Hence the means for driving the generator deserves thoughtful study.

In Fig. 1 the several methods of obtaining the coupling between generator and engine are shown. Each combination or device has been listed under various conditions for a period of years. The data in the chart represents practical performance.

Wooden Propellers Have Poor Efficiency

Wooden propellers are the cheapest in initial cost and weight limit. These good points are more than offset, however, by very poor efficiency. Due to high speeds of rotation it is nearly impossible to make a wooden propeller having an air resistance equivalent to less than one hundred pounds of dead weight. At least fifty pounds of this equivalent weight is unnecessary burden which cuts up the difference in fuel cost between wooden propeller and other drive systems. Also any type of dead weight propeller involves at a rate depending on the speed of the air stream. As a result radio generators driven by wooden propellers have a considerable voltage variation. Alternating current machines have in addition a constantly changing frequency which is applied in the side of the transmitted signal. The wooden propeller, then, is not practicable as a means for driving the radio generator.

Direct gear drive from the engine is another method by which the generator may be coupled. In this case the generator is mounted inside the engine and often on an installation in flight. When combined with a variable voltage regulator the engine driven generator will give an unvarying voltage

regardless of substantial changes in engine speed. Alternating current machinery, however, still changes directly as its speed. The direct drive, the gear driven generator or weight forty pounds against twenty-five pounds for the propeller drive type. Part of this difference in weight comes from the necessity for mounting the generator on the hot engine within the cooling where poor cooling is available. Copper and iron cannot be worked here but the heat loss up the insulation. Ten pounds of copper, iron and insulators must be added to offset the deficient cooling. Our direct drive machine runs at a lower speed than the propeller type. Another five pounds must be added to secure equal performance at the reduced speed. In multiple engine planes the direct gear drive is not desirable. Should the driving engine fail there would be no further radio transmission, yet radio



A radio telephone at Billings on the Trans-Continental Air Route. Range currently estimated at 30 to 300 miles.

is most needed when engine fails. To use the generator for emergency communications without main engine power it would be necessary to include a clutch which would permit the generator shaft to be disconnected from the gear. This is an added mechanical complication on the engine and shaft weight. On the whole the gear drive cannot be considered as the most suitable. Possible failures on multiple engine craft and the difficulties attached to a clutch connect are defects not found on another method of drive.

A battery operated dynamo has had some application in the country. Here again there are no parts in the air stream. The great weight of the battery or the added weight of a charging generator makes this scheme of no value to commercial aircraft.

What appears to be the best of coupling methods is the self-regulating propeller. This propeller has a single blade the pitch of which is varied by a governing mechanism. The profile of the part of the propeller on the slip stream side of the propeller involves a uniform rate. Voltage and frequency are constant whether the aircraft is travelling at forty or one hundred and forty miles per hour. Generator speed is high and cooling is excellent, therefore a small and light machine may be used. The perfect condition of the propeller hub and the efficient varied section blade make the use of resistance of the propeller very small. Total weight (blade + squarer) is about the same as for the gear driven generator. In emergency the propeller may be returned easily and the generator driven by a battery. The failure of a single engine on a multiple engine craft will not affect this type of drive as long as a flying speed is excess of forty miles an hour is maintained. The self-regulating propeller has been used extensively in the country and has reached a high stage of development. It is a rugged unit requiring no attention. Of the present day prime sources for radio generation it is a class by itself for all around performance.

Wind Tunnel Tests Necessary

The design of aircraft generators depends to a large extent on the method of drive. As shown above a propeller drive machine presents a smaller generator. Full advantage should be taken of the smallest cooling which is available to propeller drive machines. Generators which will run satisfactorily hot on the ground in a quiet room will run cold under a heavy over load in flight. The American generator manufacturers have been slow to realize this phase of design, principally because the machines have been judged by ground test stand performance. It should be stressed that a propeller driven generator should be tested in a wind tunnel and not on an ordinary bench.

In passing the goal of the aircraft generator builder should be the least cost and copper and smallest cooling which will give capacity, reliability and the required output under conditions of normal flight. The four or ten per cent improvement in efficiency which may be had from aluminum copper and iron will be more than offset by the expense of increasing the added dead weight and increasing the extra air resistance.

The following specifications are the basis of aircraft generator design:

1. The low tension windings of D.C. or the motor windings of A.C. generator should be well vented (the generator should deliver power without the necessity of a preliminary "kick").

2. The low tension or motor windings should supply ample field current when in series with a twelve volt battery.

3. The generator should be capable of delivering twenty per cent of its rated full load on the high tension or A.C. side when the low tension windings are operated as a motor with a twelve volt battery as a source of current.

4. The field core casing and the generator base should be cast in one piece from aluminum or light metal alloy of suitable design.

5. A propeller driven generator should

a. Have shaft machined from a forging of high grade steel.

b. Have shaft with no grooves or abrupt changes in

c. Have ball bearings which take up thrust as well as

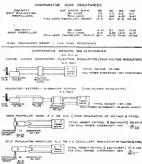


Fig. 1. Aircraft radio prime mover and generator characteristics.

a. Have no perceptible side play of shaft in bearings.
b. Be capable of delivering twenty-five per cent overload for a period of one hour without serious rise in temperature when operated in a wind tunnel with an air velocity of 80 m.p.h.
c. Weigh with propeller not more than 30 lb. in the 200 watt size.

6. A gear driven generator should
a. Have a voltage regulator which will maintain voltage constant under wide variations in engine speed.
b. Be capable of delivering twenty-five per cent overload without serious rise in temperature when operated in an ambient temperature of 500 degrees Fahrenheit.
c. Weigh with gear not more than fifty lb. in the 200 watt size.

7. All bolts and nuts, all removable parts should be securely locked in place.
8. Other items follow standard electrical and mechanical practices.

A telegraph transmitter requires a high voltage direct current for its operation while a telegraph set may be designed for the use of either D.C. or A.C. Admitting the advantages of the telegraph it has been pointed out in a previous article that telegraph signals have a greater carrying power. Hence it is very desirable that a telegraph attachment be provided on all telephone transmitters. If full power telegraph is desired this may be done by a switching arrangement, if fairly less power is permissible the keying system will perform the required function. The distance and location of ground stations where the airways will dictate the type of control to be chosen.

On the smaller aircraft the pilot may also act as radio operator. There is, of course, no room to mount the radio apparatus in the pilot's cockpit. The transmitting equipment, then, should be so constructed as to be readily adaptable to remote control. This will allow it to be mounted near the

tail in the fuselage, inside the wing, or in any other space. A small operating panel with antenna, controls and small receiver is placed in a convenient spot in the pilot's cockpit. The new wavelength bands assigned to commercial aircraft by the latest International Radio Conference are ideally suited to the needs of the industry. Simplicity in tracing arrangements and remote control provisions are possible because of the proximity of the bands. Aircraft transmitters should make full use of the new wave assignment by eliminating unnecessary wave length ranges which reduce efficiency and complicate controls.

To prevent overload on the vacuum tubes and generator all aircraft installations should have a circuit design which reduces power input while the output power falls off. Landing antennas should be slotted whenever possible. This may be done in such a manner as to have an air gap



A Greiner-Wheeler aircraft radio generator disassembled.

between parts subjected to high voltages. Air is an ideal insulator. It has low losses, is automatically renewable and weighs nothing. These three features make it of highest utility in radio transmitters for aircraft work.

The vacuum tubes in the transmitter should be of a size such that their maximum rated voltage is the normal generator voltage. This will allow very good operation of the weakly powered emergency voltage. When tubes are used which are rated at a voltage considerably in excess of the generator voltage it is often impossible to make them work at full low-voltage ratings.

Plugs, switches and other sources of trouble from poor construction should be reduced to a minimum number. Points of wire to wire or wire to fitting must be mechanically secure before soldering. Solder and solder must be heated securely. If possible the wire transmitter should be mounted in such a manner as to be shielded against vibration. Lacking such a mounting the tubes, at least, should be protected against vibration and shock.

Four Tube Receiver Most Desirable

The key for the radio wavelength set and power control features for any kind of equipment must be absolutely good night and day. This is already standard practice. It is important that the receiving or relay installation be done guided on specific procedures. Reliable or aerial receiver placed over conductive bodies effectively prevent an electric spark from coming into contact with any portion of other conductive body to cause fire.

The four tube wavelength band selector has made the receiver problem much easier of solution. In addition to selecting the desired radio and ordinary communication bands, the four tubes together the wavelengths are all at a rate in which operation, interference is of small intensity. By reason of the narrow wavelength range an efficient wave control can be applied to the receiver which makes it adaptable to being connected to a receiver from the field.

For all purposes a four tube receiver seems the most desir-

able for commercial aircraft. More sensitivity can be obtained but at an expense which is not warranted on the small air routes. A four tube receiver will have a communication range of three hundred miles when working with a ground radio telegraph station of one kilowatt power output. The telephone range is considerably below this.

In standard ground receiver antenna efficiencies are made up to the use of additional vacuum tubes. Aircraft apparatus can tolerate no such methods. To conserve space, weight and battery life it is required that each circuit perform a maximum effectiveness. "Tuned" antenna, unattended rudimentary, and power balancing do not have any place in an aircraft receiver.

The same cautionary points must be recorded in the maintenance of receivers as for transmitters. A schedule of regular checks, care in joints, isolation of wire and screws and caulking from shock are all essential.

Modern Helicopters Have Good Ear Covering

No one piece of equipment has ever had such jobs as it is now considered as has the aircraft radio helmet. Yet when properly fitted it is a very comfortable head covering. For the benefit of the old timers it may be stated that old sponge rubber ear caps with the flexibility of a brick's bottom are no longer in use. Modern helmets have a skin capped rubber ear covering which is snug and effective.

The receiver "B" batteries are small 22½ volt cells which may be placed inside the receiver case. These 16½ batteries are developed especially for aircraft. They have a comparatively long life and furnish ample power for the receiver vacuum tube plates. Both the receiver and transmitting unit elements should be lighted by current from the engine or battery system which the generator law known winding is fitted. This twelve volt battery must have a fairly large capacity and should be of the lead acid type. Manufacturers have developed a special type of lead battery which is con-



A three-quarter horsepower radio generator and self-regulating propeller.

cast and rather lighter than standard automobile batteries of the same rating. Moreover the vacuum batteries are provided with a non-spillable case which prevents any of the battery solution leaking out when the plane is flying at a steep angle. This is an important item for a field and land, will cause damage to fabric or fittings which may be used to repair or which may weaken the structure of the aircraft. The weight of a battery is not seriously objectionable in radio alone carried from this source may be used for the receiver and landing lights, etc. A twelve volt aircraft lead battery

of suitable capacity for this work may be had or weights between 20 and 30 lb.

A wiring system is needed to transfer the antenna from the power to the transmitter, receiver and disconnect the generator to the transmitter, etc. The process may be manual or automatic. No serious problems are involved. Weight and space must be conserved and special provision taken that all five contacts are broken within a 15-second swing.

Either copper clad steel or standard bronze wire may be used for the trailing antenna. The recommended steel wires are readily suited for aircraft use. Wire with its own steel core and therefore hangs more easily against for a given antenna weight. Its strength is as great as that of the standard bronze often used.

Kites are Optional Equipment

Wood roosters who were preparing for the Delta Flight claimed to have found that the copper clad steel wire when rolled out made the magnetic compass to deviate several degrees. Such an effect is possible but seems unlikely, especially on craft with steel tube fuselage construction. No considerable check has been made of this reported phenomenon as yet.

Kites are optional equipment which may be needed against a forced landing. For overseas flights the kite is a valuable accessory to the emergency provisions. A well made kite will carry skill in antenna in a very light wind. Modern kites will work and seldom drop. The kite system is easily as effective as the trailing wire from an aircraft in flight. The severity per inch of fall power signals put into a kite antenna have very possibility of being based on the first transmission. To conserve the chances of achieving recognition by search parties a four foot square light colored indicator may be carried with the kite.

The foregoing principles have indicated the major design features which have been found to be of value in the aircraft radio apparatus. It would be impossible to go into more detail in an article of considerable length. Suffice it to say that the equipment should reflect an accurate degree of the fact



President Coolidge presenting the Herbert S. Gifford Memorial Trophy to Captain Arthur C. C. N. in the White House. The trophy is awarded annually to naval aviator showing the most skill in the use of the aircraft. The trophy was presented during the fiscal year and it goes to Lieutenant Guyton after his record of 100 flying hours. On the right is Secretary of Navy Curtis D. Wilbur.

that it is to be used on an aircraft. The compromise between weight and electrical efficiency is a matter of sound judgment and broad experience. Power and weight are not items to be decided by the length of the paper alone, but by the results which may be obtained. The writer is not one of those who believe that any radio is better than none at all. Quite the contrary. An inadequate radio installation may be worse than none. It will build up false confidence when conditions are ideal and fail utterly in bad weather or in an emergency.

Aircraft radio equipment should not be purchased from the casual manufacturer. It is a product which demands the knowledge of the operator in its design, and the infinite attention to detail in manufacture which can only be obtained from an organization where skill and integrity are passed on.

A fifth article by Mr. Hyland will appear in an early issue of *Aviation*.

William E. Arthur & Co., Inc., to Develop the Bridgeport Airport

WILLIAM E. ARTHUR & COMPANY, INC., has awarded the contract for developing the Bridgeport, Conn., Airport and started actual work on it on Oct. 22, putting in dikes, fill, etc. A 20-inch dredge started work on Dec. 1, clearing the channel and filling in the swamps and other parts. Approximately 500,000 yd. of fill are required for the field.

There will be two runways, roughly from 3,000 ft. to 4,000 ft. in length. These will also be a runway channel, 250 ft. wide and approximately 1,200 ft. in length, extending from the Housatonic River to the field. A hangar and station building will be erected, and the field will be fully lighted for night flying.

Airplane manufacturers have been made for future aeronautical manufacturing. It is planned to make the Bridgeport Airport a high-class field in every respect, and it will undoubtedly be one of the main steps on the New England road to aviation.

French Air Mail Service Carries 7,000,000 Pieces of Mail in 1927

THE NUMBER of letters and postal cards carried by the French air mail service has been increasing rapidly. At the annual session of the Technical Commission on Aviation recently held in Paris, M. Leber, French director of air mail, said that during the year 1927 7,000,000 letters and postal cards had been carried by the French air lines, as against 1,000,000 in 1925, when the air mail was in its infancy.

U. S. Navy Building Flying Boat With 3,000 Mi. Cruising Radius

THE U. S. Navy is building a flying boat at the Naval Aircraft Factory, Philadelphia, Pa., a long range flying boat with a cruising radius of about 3,000 mi. No details of the plane will be made public before it has been tested though it is understood that Donald A. C. Macdonald will be assigned to the plane. Commander Beale will be command of the NC-4 on its transatlantic flight.

FOREIGN AERONAUTICAL NEWS NOTES

By Special Arrangement with the Automotive and Transportation Divisions,
Bureaus of Foreign and Domestic Commerce

India Air Transport Company Formed

The Indian Airways, Ltd., is being formed by a firm of Bombay merchants in Calcutta. It is reported. The capital will be 1,000,000 rupees, divided into 100,000 shares of 20 rupees each. It is understood that the government will lend assistance and that one of the first services will be between Calcutta and Bangalore. Foreign personnel will be employed in the beginning and later replaced by natives.

Plan Buenos Aires-Atencion Service

The Latamers Co. has completed an agreement with the Paraguayan Government under the terms of which the company is authorized to carry mail between the two cities for a five year period. Flights will be made in Buenos Aires, Pampa, Buenos Aires, Bella Vista, Corrientes, Montevideo and Pampa. Three trips weekly in each direction, the first leaving Buenos Aires and Atencion on Monday, Wednesday and Friday. The flying time, with stops at the points listed, will be seven and a half hours. The service will be operated in connection with the service to be inaugurated by the company between France and Buenos Aires.

Helsingfors Service Temporarily Discontinued

All air communications between Helsingfors and other points have been discontinued temporarily. The first service to close down for the year was the Helsingfors-Roski traffic. The service between Helsingfors and Roski will resume on Jan. 10, 1928, on condition permitting. It is expected that the Stockholm-Helsingfors planes will resume the service some time during May, 1928. The directors of the Aero Co. recently placed a final verdict against the Helsingfors line which opened on Jan. 10, 1927, carried a total of 1,542 passengers during the season. The first flights on the Helsingfors-Roski line started on Aug. 14 and discontinued 30 days later, proved to be successful, having carried 74 passengers. The Helsingfors-Stockholm service has also developed very satisfactorily. In 1926 this service was opened and during that year 180 passengers were carried, in 1927, 430 passengers used their planes, in 1928 the passengers totaled 752 and in 1927, 1,202 passengers took advantage of this service. It is planned to make two trips daily during the coming season. The first plane will leave Helsingfors at 9 o'clock in the morning and the second plane at 3 P.M. It is hoped that a bigger plane will be purchased, capable of accommodating 17 passengers and with a payload of 2,250 lb. of postal matter.

Airport at Buenos Aires Proposed

Plans for the construction of an airport at Buenos Aires have been submitted by the Argentine Civil Aeronautical Department to the Minister of War for approval. The project calls for the utilization of a tract of about 300 acres in Belgrano, six miles from the center of the capital. Plans include hangars, warehouses and shops for loading and servicing both land and airplanes. An aeromedical cen-

ter, library, weather bureau post, wireless station and other modern equipment is provided for in the program. A specially built light tower to spread a powerful beam for directing night flights is also planned.

It is estimated that about \$4,200,000 will be required for construction. Financing of the project is planned over a period of five to ten years.

Impetus to the program is said to have been given by the proposed new German dirigible service from Berlin, Spain, to Buenos Aires.

Swedish Air Company Asks Subsidy

The only Swedish civil air transport company, (Akkis Aero-transport, Stockholm) submitted a proposal for expansion and government aid for the budget year, beginning July 1, 1928 to the government. The company mentioned the necessity of making more efficient use of its equipment by extending services over longer routes. The service terminating at Amsterdam might probably be extended to Paris. It is proposed to maintain the Stockholm-Helsingfors service over a greater part of the year at least for carriage of mails and goods and then a direct line between Stockholm and London be established.

A subsidy of 100,000 crowns for actual flying and 150,000 crowns for the government's air traffic loss had been requested. These figures compare with 500,000 and 300,000 crowns for the current year.

The company reported satisfactory traffic and improved regularity during the season. The number of passengers is steadily increasing. On the Stockholm-Helsingfors line 370 were carried in 1924, 425 in 1925, 929 in 1926, and 1,542 in 1927. No serious accidents have occurred and no growth here has damaged since the company began operation in 1924.

Dominion Establishes Three Weather Stations

Three aviation stations on the shores of the Hudson Strait have been established by the Dominion Government, to observe and report on ice and weather conditions obtained during the year. Each post has 12 pilots and a complete equipment.

Use Scotha Planes in Mine Work

A. J. Brown, Salt Lake City consulting geologist, returning from a mine examination in South America declared that aviation is greatly aiding in the development of those tropical countries. In seven hours, by Scotha Co. airplanes, he made the journey spacious several hundred miles from Baranquilla, a port near the Atlantic, to Orizaba, about 350 miles west of Bogota.

"By air we completed in a day and in comfort, a trip that took the Spanish conquerors, Quetzals, 13 months to make overland," Mr. Brown said. "Of the 600 soldiers, Quetzals had at the start of the long jungle trek, fewer and fewer and reduced this number to 100. With these he conquered a civilization of a million souls."



The distance of a Trans-Pacific hop is daily flown by "Wasp" engines with the Transcontinental Air Mail

More than 4,000 miles daily is the routine performance of the "Wasp" equipped Boeing mail ships. Over plain and desert, the high Rockies and Sierra Nevadas, through heat and cold, rain and fog, the modern "Pony Express" carries on.

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DEPENDABLE ENGINES

Side Slips

by EDWARD R. COHEN

The newspapers state that there is a possibility that Colonel Landwehr may pay an official visit to a number of other Central and South American countries after his visit to Mexico is completed. Mexico, at least, has been in very stable condition, politically speaking, for a number of years now, but we do hope that there will be no hope for some of our more qualified neighbors until a ruler comes up and can be installed as the "figure on the line." This would be to enable the Colonel to become acquainted with any changes in administration which might have been made while he was in flight. It would be embarrassing indeed, to ask on leaving the officials who had been shot out of office as to how or to whom the members of his party should be offered tea to good discussion, where this might be overheard, the number of revolutions his engine is turning up.

The Mexican newspaper El Universal Gráfico, is very sympathetic over Landwehr's visit, stating editorially, "A professional diplomat must come with a certain amount of formality, whereas Colonel Landwehr comes dressed in overalls and without pretensions." It is all very well to take Colonel Landwehr's visit as informal but there is one detail we must not let be overlooked wherever he may go—particularly when Mexico has friend wouldn't mention it, but we'll take the chance—the loss of a pair of pajamas might be appreciated.

"Colonel R. Rex is going north seeking World War Aces," has been reported recently being a possibility, it is not possible that he will find them, nevertheless, the single have had, as a Civil War veteran might say, that he "did" during the World War.

The newspaper service, can't wait any opportunity to furnish complete inside details about our sort of an aeronautical accident. Literally a large landing place which had to be struck down out-of-the-way in an entire field, because of lack of a longer or different one, was reached by a sudden windstorm of great intensity. The newspaper accounts of the accident stated "The engine and propeller were badly damaged." We were very much surprised that the article had stated also "The engine was found some miles away from the wreck, and the propeller two hundred yards away" so that would have made the wreck almost much more interesting and bloodcurdling, and would have been approximately true. The engine had been removed from the plane for inspection and overhaul and the propeller stored in a nearby hangar a week or so before the unfortunate windstorm.

Looking over our headlines printed about this time a year ago, we find that we promised to get the material for this column in on the day the other thought it should be in, but at least one note. Possibly we didn't quite make good on this, but we do think we reduced our average lateness by about a day. By sincere effort during the coming year we may actually be able to get a column in on time. We assure that issue will be distinguished by a star on the cover (Editor's Note: A star on the front of Aviation or a Mark on the front of the column in our notation for 1928.)

Quite Often the Little Things Count

IN the STEARMAN the leading edge of the wings is covered with plywood, the internal drag bracing is of tie rods that will not stretch, — the fuselage framing is of light steel tubing and there are no wires within the fuselage which need attention.



The Stearman Wheeland Mail Plane

STEARMAN AIRCRAFT HAVE A PERSONALITY.

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AIRPORTS AND AIRWAYS

Armonk, N. Y.

By Everett H. Newhall

Construction work here at Armonk is progressing very rapidly. The two runways are nearly completed. One runs out and west and will be 3,000 ft. long. The other runway running pretty nearly right angles, will be 2,000 ft. long. Work is now going on at the ends of the runways and just outside the field to clear all the approaches of obstacles such as trees, bushes and old houses. When completed this field will come under the category of a first class airport. The new hangar 80 x 200 has just been completed. It is now owned by Truett. There is a very well equipped operations office on the field containing a reception room for passengers, an office for the personnel of the airport and a complete photography equipment including dark room and dispatch office. A gasoline supply tank has been installed on the field. By the early spring it is expected that the Hamlet Airways, the owners and operators of this field, will announce its opening. This is the only field north of New York City that lies within the newly designated greater New York district.

Some activity has been noted on the latter part of the field in the way of passenger airport building construction work. The Hamlet Airways, Inc., have made an arrangement with the Bronx Aero Club to give its members hope of a greatly

reduced fee. Operations will be carried on over the winter as a matter of fact, but next spring there is expected to be quite an amount of activity at this field. It lies practically in the middle of Westchester County, and is only 45 minutes from New York and within very interesting distance of such famous scenic resorts as Westchester Hills, Briarcliff Lodge and the Plover at Armonk, Ossining, Croton. The Hamlet Airways has 50 planes on order from the Travel Air factory at Wichita, of which company it is the eastern representative. The financing of these planes from Wichita will commence in the early part of January. Leo Felsky, the chief pilot and secretary of the organization, and Tom Barrett, the president, are responsible for the great strides that are being made. Their efforts will probably only start to bear fruit early next year.

Gloss Falls, N. Y.

The only new runway between New York and Montreal and between Boston and Buffalo, has recently been completed at Gloss Falls, N. Y. It stands on the roof of the Home Office Building of the Gloss Falls Insurance Company. The runway was planned and erected by Government Air Service officials and is now rapidly designated and listed in all government air-traffic guides.

Is looking for a place for this marker which was necessary



This Beacon was also installed on the Department of Commerce

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the first piece of equipment should be a G-E 24-inch beacon. A majority of the beacons already installed by the Government on American airways are of General Electric manufacture.

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GENERAL ELECTRIC
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can readily be obtained at the field any hour of the day. The Flyers, Inc., and the Clifford Flying Service have been using the field for commercial purposes. The former company is the agent for Travel Air planes. Capt. E. M. Fowler and Bob Aldridge operate this company. The Clifford Flying Service is headed by Dr. Clifford, of the Massena Hospital & Eye Department. A standard is used for instruction purposes and as far this season the school has had 16 students, 11 boys and 5 girls.

The plans of James Leavitt, engineer in charge of construction for the new municipal airport, call for sufficient ventilation to secure a Department of Commerce triple A rating. There will be long runways, in the shape of a square, each about 3,000 ft. long and 100 ft. wide.

Rochester, N. Y.

By J. F. Farrow

The latest buzz in Rochester this time of the year are Wilkies Dangle, Otto Enderton and Roy De Val. The boys are operating from De Val Field on the East Henrietta road and make flights every day for business concerns.

Fred Hennessy, one of Rochester Flying Club's licensed pilots is leaving within the next few days for a barnstorming tour in Pennsylvania. Hennessy, operating at Brant Aviation Field, expects to operate in the western part of Pennsylvania until the latter part of February.

Superior, Wis.

The Lions Club of this city has appointed A. A. Johnson, L. E. Ames, Russell Morris, Edolph Anderson and D. M. J. Gannon as a committee of five to determine what improvements are most urgent at the Arrowhead Aerodrome Field. Capt. C. C. Le Bonville is now one of the pilots of the

Arrowhead Airways, and, in conjunction with the usual work in connection with a commercial field, he will give flying instruction. Eddie Midskall is the other pilot at the field. The students can under instruction are planning the purchase of a light commercial plane.

The Head O'Leary Flying Club was recently formed here for the purpose of promoting interest in aviation at the Head of the Lakes. The club, which is composed of students of the Arrowhead Airways of Superior, discussed at its last meeting the possibility of having a Coast or Beach airplane. Anyone taking pilot lessons at the Airways automatically becomes a member of the club, but, members may also join who are interested in aviation. Eddie Midskall and Captain LeBonville, pilots of the Airways, are advisors of the club.

Milwaukee, Wis.

By M. C. Branner

Milwaukee's campaign to help boost the air needs in meeting with marked success, and according to the results of 2,500 questionnaires submitted to industrial and commercial concerns in the city by the air mail committee of the association of commerce, 66 per cent. of the number answered that their companies know that air mail posted in Milwaukee before 5:45 P.M. would arrive at New York before 7 A.M. the next day.

Air mail has been of value in obtaining business, 25 per cent. of the replies indicated, while 48 per cent. gave instances of particularly valuable experiences with air mail. Increasing the air mail volume in the immediate goal, but the object is more far reaching than that. When, through the efforts of the postmaster and the association of commerce, Milwaukee was placed on an air mail route in 1926, Milwaukee business picked 360 lbs. of air mail a day. That was

a goal impossible of fulfillment, and the average is now 20 lbs. a day. It is hoped to increase this volume.

Madison, Wis.

Madison's air mail service is now underway and from all indications will be a successful venture. More than 10,000 pieces of mail were handled in the two shipments which were made in the opening day. William A. Brown, postmaster of Madison, has announced that he will be placed in mail boxes around the square and in the principal hotels indicating the closing time for air mail letters.

Havana, Cuba

By Eustis D. Miller

The Havana Airport shows increased signs of activity since the Pan American Airways inaugurated its twice-a-day passenger and mail service between Key West, Florida, and Havana a few weeks ago. The airport, which is the Cuban Army aviation field, lies between the Country Club park, the Maritime bathing beach and the Alcazar de Velasco. The celebrated Alcazar Hotel is adjacent. The Army has five hangars and a considerable number of barracks around the field, and the Pan American Airways is building a large



Left to right: Eusebio Jose de Mendez, director de Correos de Cuba; J. M. Kuen, U. S. postal agent of Cuba; W. Irving Glover, second assistant postmaster general. Assistant Postmaster General Glover recently flew from Cuba to the United States, after accepting the new air mail service between Key West and Havana.

hangar and shop sufficient to shelter one of their Fokker tri-engine monoplanes and service the same. The schedule, which they have down on exact time, takes mail and passengers from the New York lands via landward in Key West and departs at 8 A.M., arriving here one hour later. The same plane then flies back to Key West at 4 P.M., catching the New York train. Flights are made every day, while heretofore the steamer brought mail only five days a week.

The field in Key West is narrow but ample, and is right at the center of the railway station and docks. Capt. John Montgomery, Bureau officer in the aviation service of both U. S. Army and Navy, is directing the P.A.A. activities here and has offices at the Berle-Hiltman, Havana's leading hotel. The two pilots, Edward Wecker and

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High Walls are well known fans of the big Fokkers. The company now owns two of these planes.

As yet the air lines are not accepting passengers, but the service will soon be inaugurated, General MacKenzie says. The new tri-engine Fokkers are greatly admired by Havana's flying folk, who were honored a couple of years ago by a visit by the first of this craft piloted by Lieutenant Paul, U.S.N., and accompanied by Anthony Fokker. This same plane was later to become famous as the one Commander Boyd flew over the Miami Falls.

Assistant Postmaster General W. Irving Glover spent a few very busy days in Havana recently with the Cuban postal authorities. He made an inspection flight to and from Cuba on the new mail planes and expressed himself as well pleased with the service.

The Cuban Navy has accepted delivery at the New Jersey plant of a Fokker Universal seaplane, which Captain LeBaronde will fly to Cuba.

The West India Aerial Express ferried a Kermesse tri-engine airplane through Havana just recently, bound for Santo Domingo. This is a under ship to the old-fashioned "Antares" or "Lepanto." This service will operate between the principal cities of Haiti, Santo Domingo and Cuba.

Minneapolis, Minn.

By H. A. Lindbergh

Minneapolis is another city that is added to the constantly increasing list of municipalities that are considering the purchase or lease of an airport.

The field, which the city is planning on acquiring as a municipal airport, is a tract of land known as the Wolf-Clasler Field. There seems to be a misunderstanding on the part of a number of people who are acquainted with this airport, that it is municipal property at present, but this is not so and possibly will not be unless a well timed to serve the future interests of Minneapolis better than after possible sale at most respects considered.

Most of this property is enclosed by an abandoned circular concrete race track, which makes it easy to locate from the air.

The plans and equipment of the 100th Aero Squadron, Minnesota National Guard, with Major R. S. Miller commanding, occupy three hangars, which are located in one group in this field.

The Council Ways and Means Committee recommends that the Council act on the Park Board's request to the Board of Estimates and Finance for an appropriation of \$150,000 to acquire a municipal airport.

This action, if approved by the Council and the Board of Estimates, will enable the Park Board to confirm the approval of the Board's report for the acquisition of the Wolf-Clasler Field, but does not bind the Park Board to acquire the property.

The Park Board has had an appraisal made of the field, but it cannot confirm the report until funds are available. If the \$150,000 of bonds are authorized, the Board will immediately confirm the recommendation's report and will then maintain if the owners of the property intend to appeal from the award.

Should appeals be taken and the final awards be increased beyond the \$150,000, then the acquisition proceedings will be dropped and another one will be sought, park officials informed the Ways and Means Committee.

Representatives of the Real Estate Board and Civic & Commerce Association told the committee that immediate steps should be taken to acquire the property for a municipal airport.

Not the latter of the Civic & Commerce Association has helped the trend of growth of the city will be toward

the south and suggested it might be wise to select a site in a location which St. Paul might wish to join in maintaining.

On the surface this suggestion seems feasible, but if this idea were about to become a reality, then alterations would have to be made in the carrying through of such a municipally-owned project. St. Paul has a municipally owned airport at the present time, so it is not doubtful that such city's reputation to mention in considering that they have split ownership as such an important community need as an airport.

Rochester, Minn.

After a recent conference with Congressman Allen J. Parlow and business and civic leaders of Rochester, Col. H. H. Dutton asked permission of the Post Office Department to establish a point of exchange at this city on the air mail line operated by the Northwest Airways between Chicago and the Twin Cities.

Colonel Dutton has said that if a suitable landing space is provided, lights are installed and a license is held, he will petition the Department of Commerce to establish a scheduled landing field at regular intervals between La Crosse, Wis., and the Twin Cities by way of Rochester.

The advantage of passenger service east and west from Rochester is obvious, as this city is known all over the country as being an important railroad center.

San Diego, Calif.

By F. E. Hendley

San Diego's municipal airport, which it is planned to make the first triple-A flying field in America, will be ready for dedication Sept. 1, 1938, according to an announcement by the Board of Commissioners.

It is stated that Col. Charles A. Lindbergh, in whose honor the field has been named, and other prominent figures in the aeronautical world will be invited to attend the dedication ceremonies.

It is estimated that about 5,500,000 cubic yards of material will have to be excavated and laid with very closely to be excavated for this work. This excavation will open up water at the mouth of the main gate approach that will permit the great 35,000-ton carrier barges to enter with the tide without danger of her stranding.

The airport will be managed under the direct supervision of the Harbor Commission. The commission is planning to build modern hangars and a complete gasoline and kerosene oil service station from which the harbor department expects, and should receive, considerable revenue.

T. George Howe, head of the Ryan Aeronautical Corporation, who plans here to use for the manufacture and national distribution of the Ryan-Stinson line, seven and nine cylinder aircraft engines, expects to file application with the Harbor Commission for permission to erect his proposed plant near the airport.

The R. F. Mahoney Aircraft Corp. also is planning to have one of its buildings adjacent the airport in that its planes can be wheeled directly on to the flying field from the shops.

Glendale, Calif.

By C. E. Johnson

This city will vote upon the matter of establishing a municipal airport in the near future.

The Glendale Aircraft, Inc., recently moved from Los Angeles to a site near the Glendale Airport, which is at present very privately owned. The latest work on the Pacific Coast is located at the Glendale Airport. It is 90 by 60 by 212 ft. Another airport is under construction.

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Townsend Company's Windward Travel Air monoplane. The Royal Naval Air Corps is considering a passenger line through Rochester, Chicago and Madison, to be supplemented later by mail and express. This line should provide a stimulus to aviation here and enable the city to its need for a link across municipality owned airport.

Chicago, Ill.

By R. A. Lamborgh

The mail service has finally been transferred to the Municipal Airport at 61st St. and Center Ave. after a number of delays since October. The last plane to use the old Skywood Field was a Boeing Air Transport, which happened off as its maiden trip in the evening.

This new airport is equipped with hangars and modern lighting facilities, making it one of the best and busiest fields in the country.

According to W. A. Peterson, the Chicago traffic manager for the Boeing line, the new location is ideal in a number of respects as there are better runways, more complete lighting systems, more fully equipped hangars and comfortable accommodations for the passengers.

The area that is proposed on a site for a Class A airport is located between 18th and 41st Streets, in the territory known as Harbor District No. 3.

Before work on the island airport can be started, it seems as if two steps should be followed. In the first place an ordinance should be drafted which will transfer the city's airport to Harbor District No. 3, secured under the Lake Front Improvement Ordinance of 1932, to the South Park Board. Secondly, permission should be sought from the War Department for the South Park Board to build this proposed airport.

Definite plans for a North Side lake front airport were announced by President David H. Jackson of the Lincoln Park Commission. The decision to establish an airport in this vicinity was reached by Jackson at a luncheon in the Edgewater Beach Hotel, when the opening of the water drive extension from 41st St. to Madison Ave. was celebrated. The proposed airport would, according to present plans, be built at the foot of Foster Ave. or at the foot of Grace St. It would be L-shaped or so as to be adjacent to a harbor that could be provided for airplanes and amphibians. The entire location to be provided would be the tentative arrangement would be a part of the new North Side recreation plan.

Teterboro Airport, N. J.

November, which brought an unusual amount of unfavorable weather, showed an increase in air traffic at this airport. During the month 38 planes arrived and the same number departed for other points in the United States. These planes carried 68 pilots, 25 passengers, 524 and mailmen on express trips and 225 passengers.

In addition to these cross country journeys, the Civil Air Corps took up for short hop-rides 2,259 passengers at the airport during the month.

Tacoma, Wash.

Shaw Bagshaw Sales Company has completed its lease at the Marine Harbor Airport, Tacoma. It has a large, well equipped tool room and completely office. It is ready for routine jobs.

Mason City, Iowa

Pioneer Flyers, Inc., Bagshaw distributors at Mason City, are exhibiting a ground school for the winter months. J. R. MacPhee of this organization recognizes the fact that approximately 20 mechanics will be used in production and maintenance of a plane against one pilot to fly same.

UNITED STATES AIR FORCES

Pan-American Flyers Receive D.F.C.

At our check on Wednesday, Dec. 23, exactly one year from the date the Landing Amphibious planes took off from Sandy Field, San Antonio, Tex., on the Pan-American Good Will Flight, the Army Air Corps officers who made up its permanent, returned Distinguished Flying Crossmen, and also the Mackay Trophy for their achievement. The Mackay Trophy is awarded each year to the most outstanding Army aviator achievement.



The Mackay Trophy, awarded to the Pan-American Good Will Flyers for the most notable aviation achievement by the Army during 1937

Major Herbert A. Dugan, who commanded the flight, and his associates, Capt. Arthur R. McDougal and Lieut. Regis C. Whitford, Charles McK. Robinson, Major S. Fairchild, Bernard S. Thompson and Leonard D. Weddington were in the permanent honor.

The decorations, which were conferred posthumously upon Capt. Gustaf F. Wadby and Lieut. John W. Benton, who lost their lives at Buenos Aires Feb. 26, 1937, when their plane collided with another plane of the flight, were presented to their wives at the ceremony.

The Pan-American Good Will Flight visited Mexico, Honduras, Nicaragua, Panama, Colombia, Cuba, Peru, Argentina, Paraguay, Brazil, the Guianas, Venezuela, the Lesser Antilles, Porto Rico, the Dominican Republic, Haiti and Cuba.

Limit Army Cross-Country Flights

With the limited equipment now available in the Army Air Corps, and with such data as presentment of new record results in a larger number of planes being available, the necessity of war, on recommendation of the staff of Air Corps, directed that Army Air Corps activities during the present fiscal year be directed that no cross-country flights of over 800 miles by Air Corps pilots and equipment will be approved unless exceptional circumstances exist or there is some military reason other than cross-country training for the pilot to justify the flight.

It is felt that the necessity of this regulation will offset, to a certain extent, the tendency of Air Corps pilots to re-

Citation was given the Stars at the close of the flight by President Coolidge, but the presentation of the crosses was made individually to the officers at a luncheon, which was attended by Secretary of State Frank B. Kellogg; Secretary of War Dugan; F. D. Ives, the appropriate representative of the United States; American countries which the flight visited, and other suitable people. Assist. Sec. of War for Aviation, P. T. Deane, Division of the War, which was held in the Pan-American Building.



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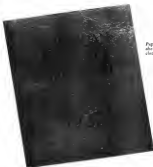
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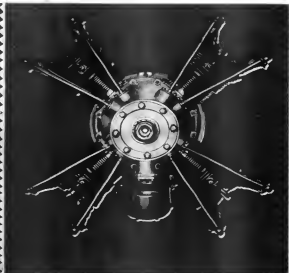


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